

I claim:

1. A cell sorter comprising:

at least one precision pump coupled to a fluid inlet  
5 port, whereby fluid containing desired cells is caused  
to enter said inlet port;

a cell detection system, said cell detection system  
determining whether a particular cell is a desired  
10 cell;

a sorting gate with at least two states, said sorting  
gate allowing said desired cell to exit a cell  
collection port and allowing waste to exit a waste  
15 port;

a control unit, said control unit processing  
information from said cell detection system and  
causing said sorting gate to select said cell  
20 collection port when a desired cell is in a proper  
position to exit.

2. The cell sorter of claim 1 wherein said sorting gate is magnetostrictive.

3. The cell sorter of claim 1 wherein said cell detection  
5 system is optical.

4. The cell sorter of claim 3 wherein said cell detection system uses fluorescence.

10 5. The cell sorter of claim 3 wherein said cell detection system uses scattered light.

6. The cell sorter of claim 3 wherein said cell detection system uses both fluorescence and scattered light.

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7. The cell sorter of claim 6 wherein a fluorescence and scattered light determination is made simultaneously.

8. A cell sorter system for sorting desired cells from  
20 undesired matter comprising a precision pump for pumping cell-containing fluid into a capillary and controlling positions of said cells in said capillary; an optical detection system for determining when a desired cell is in

a predetermined position in said capillary; a  
magnetostrictive gate controlled by a magnetic field that  
causes a desired cell to pass through a cell exit port and  
waste material to pass through a waste port; a vacuum  
5 system to cause said desired cell to exit said cell exit  
port.

9. The cell sorter system of claim 8 further comprising a  
means for applying said magnetic field to said  
10 magnetostrictive gate, whereby said magnetostrictive gate  
switches from a first exit port to a second exit port.

10. The cell sorter system of claim 8 wherein said optical  
system uses fluorescence.

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11. The cell sorter system of claim 8 wherein said optical  
system uses scattered light.

12. The cell sorter system of claim 8 wherein said optical  
20 system uses both fluorescence and scattered light  
simultaneously.

13. The cell sorter system of claim 8 wherein said optical system uses a photomultiplier.

14. The cell sorter system of claim 8 wherein said optical  
5 system uses a diode array.

15. A method for sorting cells comprising:

causing fluid containing cells to enter an inlet port  
10 of a capillary;

causing said fluid to pass through an optical  
detection region where said fluid is exposed to light  
of at least one predetermined wavelength, whereby  
15 scattered light from said cells, or fluorescence from  
said cells, is used to choose desired cells;

causing a magnetostrictive gate to sort said cells  
causing desired cells to pass through a cell exit gate  
20 depending on a decision made from said light, whereby  
selected cells exit by said cell exit gate;

causing said selected cells to exit said cell exit gate.

16. The method of claim 15 wherein said magnetostrictive  
5 gate is caused to select an exit port by application of a magnetic field.

17. The method of claim 15 wherein said magnetostrictive gate contains a magnetostrictive rod.

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18. The method of claim 17 wherein said magnetostrictive rod changes length in an applied magnetic field.

19. The method of claim 15 wherein said optical system  
15 contains optical fibers.

20. The method of claim 19 wherein said optical fibers convey light from a source to a said optical detection region.

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